

According to a preferred embodiment of the invention, the average number of segments with LCST per copolymer is greater than 2 and preferably greater than 5, and
5 more preferably still of between 8 and 40. By virtue of this large number of segments, capable of interacting in an attractive manner, a given copolymer may interact with numerous other copolymers, which confers high resistance on the medium during the passage of
10 analytes.

The length and the number of segments with LCST present in the copolymers used in the media according to the invention, as well as their chemical nature, may
15 consequently vary significantly in the context of the invention, and may thus greatly cause the viscoelastic properties of the said media to vary considerably according to the desired application, as will be shown more precisely on disclosing the examples of
20 implementation.

The media according to the invention are therefore suitable for producing thermothickening properties. For the purposes of the invention, "thermothickening"
25 refers to a medium having either a thermoviscosifying character, or a thermogelling character.

In accordance with common usage, the term thermoviscosifying is understood to mean a medium
30 remaining in the temperature range(s) for use which is capable of flowing in a macroscopic vessel, in a time compatible with easy handling, that is less than about 30 seconds. By contrast, the expression "gel-type state" is understood to mean a medium incapable of
35 significant flow under the same conditions.

In an equivalent manner, the term thermoviscosifying refers to a medium which does not exhibit in the temperature range(s) for use hysteresis of their

properties, or a significant dependence of its properties as a function of the rate of change of temperature, for rates of change of temperature customarily and conveniently used in capillary electrophoresis, that is of the order of 1 degree per minute to about ten degrees per minute. On the other hand, the expression "thermogelling medium", or in an equivalent manner "medium giving rise to a gel-type state" will refer to a medium exhibiting, under these conditions, hysteresis of its properties or else possessing a viscosity greater than 20 000 cp.

According to a preferred variant which is particularly suited to the case of automated methods in which it is desired to minimize the time between two consecutive separations, the medium according to the invention will be of the thermoviscosifying type.

According to another preferred variant, when a long waiting time between separations is acceptable and when a maximum resistance of the matrix to the passage of the analytes is desired, a medium according to the invention which gives rise at the temperature T2 to a gel-type state will on the contrary be preferred.

According to a preferred embodiment of the invention, all or some or a significant fraction of the segments with LCST possess along the skeleton an average number of atoms greater than 75, or have a molecular mass greater than 2 500, and preferably greater than 4 500.

For the purposes of the invention, the expression "a significant fraction", or in an abbreviated form "all or some", is understood to mean a proportion sufficient to give rise, through an increase in temperature, to an increase in viscosity of at least 100% or in an equivalent manner to the multiplication of the viscosity by a factor of 2.

Optimized copolymers for carrying out the invention are in particular those in which the set of segments with LCST represents between 2 and 25% by mass, preferably between 5 and 15% by mass and more preferably still
5 between 8 and 15% by mass of the average total molar mass of the said copolymers, or between 3 and 20% and preferably between 5 and 10% of the total composition of the copolymers as number of moles of monomers.

- 10 The claimed separation medium may advantageously comprise a set of block copolymers comprising a skeleton consisting of a segment or a multiplicity of segments, of an identical or different chemical nature, and exhibiting the common character of being
15 essentially soluble or else solvated in the electrolyte at the temperatures T1 and T2, to which there are covalently linked a multiplicity of segments of an identical or different chemical nature and exhibiting the common characteristic of being essentially soluble
20 or else solvated in the electrolyte at the temperature T1, and essentially insoluble or poorly solvated in the electrolyte at the temperature T2.

- 25 All sorts of structures of copolymers of this type may be used for carrying out the invention provided that they have a multiplicity of segments with LCST which are not directly connected, and give rise to reversible thermothickening under the separation conditions.

- 30 By way of illustration of various structures which may be adopted by the copolymer according to the invention, there may be mentioned most particularly those where all or part of the said copolymers exist:

- 35 - in the form of a linear block polymer,
- in the form of a comb copolymer whose skeleton consists of one or more segments which are soluble